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RS-08-068

10 CFR 50.90

May 16, 2008

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001

Clinton Power Station, Unit 1
Facility Operating License No. NPF-62
NRC Docket No. 50-461

Subject: Additional Information Supporting the Request for a License Amendment to Revise Local Power Range Monitor Calibration Frequency

References:

1. Letter from Mr. K. R. Jury (AmerGen Energy Company, LLC) to U. S. NRC, "Request for a License Amendment to Revise Local Power Range Monitor Calibration Frequency," dated December 12, 2006

2. Letter from U. S. NRC to Mr. C. M. Crane (AmerGen Energy Company, LLC), "Clinton Power Station, Unit No. 1 – Request for Additional Information Related to Revision of Local Power Range Monitor Calibration Frequency (TAC No. MD3795)," dated September 20, 2007

3. Letter from Mr. Darin M. Benyak, (AmerGen Energy Company, LLC) to U. S. NRC, "Additional Information Supporting the Request for a License Amendment to Revise Local Power Range Monitor Calibration Frequency," dated November 16, 2007

4. Letter from U. S. NRC to Mr. C. G. Pardee (Exelon Generation Company, LLC), "Clinton Power Station, Unit No. 1 – Request for Additional Information Related to License Amendment Request to Revise Local Power Range Monitor Calibration Frequency (TAC No. MD3795)," dated February 28, 2008

In Reference 1, AmerGen Energy Company, LLC (AmerGen) requested an amendment to the facility operating license for Clinton Power Station (CPS), Unit 1. Specifically, the proposed changes will revise Technical Specification (TS) Surveillance Requirement (SR) 3.3.1.1.8 and SR 3.3.1.3.2 to increase the interval between Local Power Range Monitor (LPRM) calibrations from 1000 megawatt-days per ton (MWD/T) average core exposure to 2000 MWD/T average core exposure. Increasing the interval between required LPRM calibrations is acceptable due to improvements in fuel analytical bases, core monitoring processes, and nuclear instrumentation.

In Reference 2, the NRC requested that AmerGen provide additional information in support of their review of Reference 1. Reference 3 provided the requested information. Following their review of the responses provided in Reference 3, the NRC identified, in Reference 4, additional information that was required to support their review of Reference 1. Specifically, the NRC requested that AmerGen submit a CPS specific evaluation to further support increasing the nominal LPRM calibration interval to 2000 MWD/T.

Accordingly, attached is the CPS plant specific evaluation prepared by Global Nuclear Fuel (GNF) that supports extending the nominal LPRM calibration interval from 1000 MWD/T to 2000 MWD/T. The NRC request for additional information and the specific AmerGen responses are provided in Attachment 1 to this letter. Attachment 2 to this letter provides GNF Report GNF-0000-0084-9524P, "AmerGen (Exelon Nuclear) LPRM Calibration Interval Increase for Clinton Power Station, Unit 1," dated May 2008, which GNF considers to contain proprietary information. The proprietary information is identified by bracketed text. GNF requests that the proprietary information in Attachment 2 be withheld from public disclosure, in accordance with the requirements of 10 CFR 9.17(a)(4) and 10 CFR 2.390(a)(4). An original signed affidavit supporting this request is provided in Attachment 3 to this letter. Attachment 4 to this letter provides a non-proprietary version of the GNF Report (i.e., GNF-0000-0084-9524NP).

AmerGen has reviewed the information supporting a finding of no significant hazards consideration that was previously provided to the NRC in Reference 1. The additional information provided in this submittal does not affect the bases for concluding that the proposed license amendment does not involve a significant hazards consideration. No new regulatory commitments are established by this submittal.

If you have any questions concerning this letter, please contact Mr. Timothy A. Byam at (630) 657-2804.

I declare under penalty of perjury that the foregoing is true and correct. Executed on the 16th day of May 2008.

Respectfully,

Darin M Benyak

Darin M. Benyak
Director – Licensing and Regulatory Affairs
AmerGen Energy Company, LLC

Attachment 1: Additional Information Supporting the Request for a License Amendment to Revise Local Power Range Monitor Calibration Frequency

Attachment 2: Global Nuclear Fuel Report GNF-0000-0084-9524P – AmerGen (Exelon Nuclear) LPRM Calibration Interval Increase for Clinton Power Station, Unit 1 (Proprietary Version)

Attachment 3: Global Nuclear Fuel Affidavit

Attachment 4: Global Nuclear Fuel Report GNF-0000-0084-9524NP – AmerGen (Exelon Nuclear) LPRM Calibration Interval Increase for Clinton Power Station, Unit 1 (Non-Proprietary Version)

ATTACHMENT 1

Additional Information Supporting the Request for a License Amendment
to Revise Local Power Range Monitor Calibration Frequency

In reviewing the December 12, 2006 (Agencywide Documents Access and Management System Accession No. ML063470222), AmerGen Energy Company, LLC submittal regarding an amendment to Appendix A, technical specifications (TS) for Clinton Power Station (CPS), Unit No. 1, the Nuclear Regulatory Commission (NRC) staff has identified issues which will require resolution. Specifically, the submittal requests changes which will revise surveillance requirements (SR) 3.3.1.1.8 and SR 3.3.1.3.2, to increase the interval between local power range monitor (LPRM) calibrations from 1000 megawatt-days per ton (MWD/T) average core exposure to 2000 MWD/T average core exposure. Hence, additional information is required for the NRC staff to complete its review.

First, the NRC staff finds the basis that the LPRM uncertainty increases associated with the requested calibration interval extension are bounded by the General Electric Thermal Analysis Basis (GETAB) to be inapplicable in its entirety, because GETAB has been supplanted, for this purpose, by Global Nuclear Fuel's Safety Limit Minimum Critical Power Ratio Topical Reports, NEDC-32601P-A, "Methodology and Uncertainties for Safety Limit Minimum Critical Power Ratio Calculations," and NEDC-32694P-A, "Power Distribution Uncertainties for Safety Limit Minimum Critical Power Ratio Calculations."

Second, the referenced precedential amendment requests are inapplicable because they were approved prior to referencing of the supplanting topical reports listed above.

The NRC staff has also identified a need for additional information with respect to the two items listed above.

1. *Perform a CPS-specific safety limit minimum critical power ratio (SLMCPR) calculation using a bounding LPRM update uncertainty parameter. Identify the parameter used, the NRC-approved method to calculate the SLMCPR, the change in SLMCPR, and confirm whether the currently licensed SLMCPR will adequately cover the increase in uncertainty. Justify that the uncertainty parameter is bounding of the requested surveillance interval, based on observed LPRM detector behavior.*

   Response: See Attachment 2, Sections 4.1 and 4.2.

2. *Confirm that a similar increase to nodal power uncertainty used for mechanical analyses will remain within the applicable limit. Identify the uncertainty value, its analytical limit, and how much it would increase as a result of extended LPRM calibrations.*

   Response: See Attachment 2, Section 4.3.

ATTACHMENT 1

Additional Information Supporting the Request for a License Amendment
to Revise Local Power Range Monitor Calibration Frequency

3. *Confirm that the units used in any evaluations or demonstrations that are based on neutron flux or core exposure are analogous to the fuel burn-up levels (MWD/T) licensed in the CPS TSs.*

   Response: See Attachment 2, Summary.

4. *Confirm that the analytic and statistical treatments requested above are also bounding of the TS 25 percent grace, i.e., to 2500 MWD/T.*

   Response: See Attachment 2, Section 5.

Please note that Section 4.5 of the GNF report provided in Attachment 2 refers to the Rod Block Monitor (RBM) system as one of the systems that uses inputs from the LPRMs. While this is true for some models of boiling water reactors, it is not true for CPS. CPS does not have an RBM system. As described in the original AmerGen amendment request dated December 12, 2006 (Accession No. ML063470222), the CPS LPRM system provides outputs to the Average Power Range Monitor system, the Oscillation Power Range Monitor system, the Rod Control and Information System, and the 3D MONICORE system. The fact that CPS does not have an RBM System does not affect the acceptability or applicability of the documented analysis to the proposed CPS change in the LPRM calibration interval to 2000 MWD/T.

ATTACHMENT 3

Global Nuclear Fuel Affidavit

Global Nuclear Fuel – Americas

AFFIDAVIT

I, Andrew A. Lingenfelter, state as follows:

(1) I am Vice President, Fuel Engineering, Global Nuclear Fuel–Americas, LLC ("GNF-A"), and have been delegated the function of reviewing the information described in paragraph (2) which is sought to be withheld, and have been authorized to apply for its withholding.

(2) The information sought to be withheld is contained in GNF-0000-0084-9524P, AmerGen (Exelon Nuclear) LPRM Calibration Interval Increase for Clinton Power Station, Unit 1, Class III, May 2008. GNF proprietary information in GNF-0000-0084-9524P, AmerGen (Exelon Nuclear) LPRM Calibration Interval Increase for Clinton Power Station, Unit 1, is identified by a dotted underline inside double square brackets. [[This sentence is an example.{3}]] A "[[" marking at the beginning of a table, figure, or paragraph closed with a "]]" marking at the end of the table, figure or paragraph is used to indicate that the entire content between the double brackets is proprietary. In each case, the superscript notation {3} refers to Paragraph (3) of this affidavit, which provides the basis for the proprietary determination.

(3) In making this application for withholding of proprietary information of which it is the owner or licensee, GNF-A relies upon the exemption from disclosure set forth in the Freedom of Information Act ("FOIA"), 5 USC Sec. 552(b)(4), and the Trade Secrets Act, 18 USC Sec. 1905, and NRC regulations 10 CFR 9.17(a)(4), and 2.390(a)(4) for "trade secrets" (Exemption 4). The material for which exemption from disclosure is here sought also qualify under the narrower definition of "trade secret", within the meanings assigned to those terms for purposes of FOIA Exemption 4 in, respectively, Critical Mass Energy Project v. Nuclear Regulatory Commission, 975F2d871 (DC Cir. 1992), and Public Citizen Health Research Group v. FDA, 704F2d1280 (DC Cir. 1983).

(4) Some examples of categories of information which fit into the definition of proprietary information are:

a. Information that discloses a process, method, or apparatus, including supporting data and analyses, where prevention of its use by GNF-A's competitors without license from GNF-A constitutes a competitive economic advantage over other companies;

b. Information which, if used by a competitor, would reduce his expenditure of resources or improve his competitive position in the design, manufacture, shipment, installation, assurance of quality, or licensing of a similar product;

c. Information which reveals aspects of past, present, or future GNF-A customer-funded development plans and programs, resulting in potential products to GNF-A;

d. Information which discloses patentable subject matter for which it may be desirable to obtain patent protection.

The information sought to be withheld is considered to be proprietary for the reasons set forth in paragraphs (4)a. and (4)b. above.

(5) To address 10 CFR 2.390 (b) (4), the information sought to be withheld is being submitted to NRC in confidence. The information is of a sort customarily held in confidence by GNF-A, and is in fact so held. The information sought to be withheld has, to the best of my knowledge and belief, consistently been held in confidence by GNF-A, no public disclosure has been made, and it is not available in public sources. All disclosures to third parties including any required transmittals to NRC, have been made, or must be made, pursuant to regulatory provisions or proprietary agreements which provide for maintenance of the information in confidence. Its initial designation as proprietary information, and the subsequent steps taken to prevent its unauthorized disclosure, are as set forth in paragraphs (6) and (7) following.

(6) Initial approval of proprietary treatment of a document is made by the manager of the originating component, the person most likely to be acquainted with the value and sensitivity of the information in relation to industry knowledge, or subject to the terms under which it was licensed to GNF-A. Access to such documents within GNF-A is limited on a "need to know" basis.

(7) The procedure for approval of external release of such a document typically requires review by the staff manager, project manager, principal scientist or other equivalent authority, by the manager of the cognizant marketing function (or his delegate), and by the Legal Operation, for technical content, competitive effect, and determination of the accuracy of the proprietary designation. Disclosures outside GNF-A are limited to regulatory bodies, customers, and potential customers, and their agents, suppliers, and licensees, and others with a legitimate need for the information, and then only in accordance with appropriate regulatory provisions or proprietary agreements.

(8) The information identified in paragraph (2) is classified as proprietary because it contains details of GNF-A's fuel design, core monitoring, and licensing methodology.

The development of the methods used in these analyses, along with the testing, development and approval of the supporting methodology was achieved at a significant cost, on the order of several million dollars, to GNF-A or its licensor.

(9) Public disclosure of the information sought to be withheld is likely to cause substantial harm to GNF-A's competitive position and foreclose or reduce the availability of profit-making opportunities. The information is part of GNF-A's comprehensive BWR safety and technology base, and its commercial value extends beyond the original development cost. The value of the technology base goes beyond the extensive physical database and analytical methodology and includes development of the expertise to determine and apply the appropriate evaluation process. In addition, the technology base includes the value derived from providing analyses done with NRC-approved methods.

The research, development, engineering, analytical, and NRC review costs comprise a substantial investment of time and money by GNF-A.

The precise value of the expertise to devise an evaluation process and apply the correct analytical methodology is difficult to quantify, but it clearly is substantial.

GNF-A's competitive advantage will be lost if its competitors are able to use the results of the GNF-A experience to normalize or verify their own process or if they are able to claim an equivalent understanding by demonstrating that they can arrive at the same or similar conclusions.

The value of this information to GNF-A would be lost if the information were disclosed to the public. Making such information available to competitors without their having been required to undertake a similar expenditure of resources would unfairly provide competitors with a windfall, and deprive GNF-A of the opportunity to exercise its competitive advantage to seek an adequate return on its large investment in developing and obtaining these very valuable analytical tools.

I declare under penalty of perjury that the foregoing affidavit and the matters stated therein are true and correct to the best of my knowledge, information, and belief.

Executed on this 5th day of May 2008.

Andrew A. Lingenfelter
Vice President, Fuel Engineering
Global Nuclear Fuel – Americas, LLC

ATTACHMENT 4

Global Nuclear Fuel Report GNF-0000-0084-9524NP
AmerGen (Exelon Nuclear) LPRM Calibration Interval Increase
for Clinton Power Station, Unit 1
(Non-Proprietary Version)

Global Nuclear Fuel

A Joint Venture of GE, Toshiba, & Hitachi

GNF-0000-0084-9524NP
Class I
May 2008

NON-PROPRIETARY INFORMATION

AmerGen (Exelon Nuclear)
LPRM Calibration Interval Increase for
Clinton Power Station, Unit 1

INFORMATION NOTICE

This is a non-proprietary version of GNF-0000-0084-9524P which has the proprietary information removed. Portions of the document that have been removed are indicated by white space inside open and closed bracket as shown here [[ ]].

IMPORTANT NOTICE REGARDING CONTENTS OF THIS REPORT

Please Read Carefully

The only undertakings of the Global Nuclear Fuel – Americas, LLC (GNF) respecting information in this document are contained in the contract between Exelon Nuclear (EN) and GNF. Nothing contained in this document shall be construed as changing the applicable contract. The use of this information by anyone other than EN as authorized by GNF to have this document, or for any purpose other than that for which it is intended, is not authorized. With respect to any unauthorized use, GNF makes no representation or warranty, and assumes no liability as to the completeness, accuracy, or usefulness of the information contained in this document, or that its use may not infringe privately owned rights.

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Summary

This report provides the basis for application of an LPRM calibration interval of up to 2000 effective full power hours (EFPH). The report identifies the extended calibration interval as being within the qualification basis of the core monitoring system (3DMONICORE™) for the Clinton Power Station (CPS), Unit 1. The qualification bases for the thermal limits calculations were reviewed for MCPR, MAPLHGR and LHGR.

The impact of an increase in the LPRM calibration interval to 2000 EFPH has been included in the qualification of the 3DMONICORE™ core monitoring system in use at the Clinton Power Station (CPS) units. For CPS, an interval of 2000 EFPH is equivalent to ~2360 Megawatt Days per short ton (MWD/st) of core exposure. The safety and licensing analyses are consistent with the power uncertainty of the core monitoring system, and these have been reviewed and approved by the USNRC. Therefore, operation with the LPRM calibration interval up to 2000 EFPH is justified using the existing safety evaluations.

An examination of Reference 1 was performed to determine whether the analyses performed by Exelon were consistent with the methodology of the GEH/GNF qualification bases.

1. Introduction

This report describes the basis for application of the capability to operate with an LPRM calibration interval of up to 2000 effective full power hours (EFPH). This capability is within the qualification basis of the core monitoring system 3DMONICORE™ for the Clinton Power Station (CPS), Unit 1. The qualification bases for the thermal limits calculations were reviewed for MCPR, MAPLHGR and LHGR. The qualification bases for calculation of these thermal limits has included the specific uncertainties associated with an LPRM calibration interval up to 2000 EFPH. Therefore, operation with the LPRM calibration interval up to 2000 EFPH is justified using the existing safety evaluations.

Additionally, GNF has evaluated the impact of such a change on the plant-specific calculated Safety Limit MCPR (SLMCPR), with the additional assumption that the uncertainty due to the interval update is conservatively doubled, even though the qualification basis already included the 2000 EFPH interval.

2. Scope of Evaluation

GE Hitachi Nuclear Energy (GEH)/Global Nuclear Fuel (GNF) has previously justified an LPRM calibration interval up to 2000 EFPH by comparing core monitoring predictions before and after periodic LPRM calibration. These comparisons and other prediction uncertainty studies have been periodically documented for review and approval by the USNRC. This evaluation involves a review of the GEH/GNF documentation provided to and approved by the USNRC in support of core monitoring accuracy requirements. The GNF core monitoring system 3DMONICORE™, used at CPS, includes provision for an LPRM calibration interval up to 2000 EFPH, as well as equipment failure. The following Section 3.0 documents the approach taken for this review and Section 4.0 documents the details of the core monitoring qualification basis. Section 5.0 reports the review of the Exelon evaluation of the proposed change.

3. Evaluation Basis and Assumptions

The increase in the LPRM calibration interval impacts primarily the core monitoring system calculation of fuel thermal margins. The acceptability of an increase in the LPRM calibration interval is dependent upon the accuracy of the prediction of power distribution. Therefore, the case is made in Section 4 that the increased LPRM calibration interval has been accounted for in the power uncertainty applied in the safety and licensing analyses.

4. Evaluation of LPRM Calibration

This evaluation includes a review of the bundle and nodal power uncertainty of the core monitoring system and the impact of the LPRM calibration interval. The reference documents that have been used in the review of the power predictions with the USNRC are also identified.

4.1 MCPR Power Uncertainty

GEH/GNF has performed detailed analyses (References 2 to 7) of power uncertainties in the core monitoring system. These analyses include model uncertainties and instrument update uncertainties. Since the inception of 3DMONICORE™, an LPRM calibration interval up to 2000 EFPH, a single Traversing-Incore-Probe (TIP) machine Out-Of-Service (OOS) and [[ ]]of the LPRMs failed or rejected have been included in these analyses.

Specifically, for the 3DMONICORE™ system currently used at CPS, the power distribution uncertainties are as follows for 2000 EFPH operation:

Table 1 (Ref. 6, Table 4.2)

[[

]]

It should be noted that the table above is taken in its entirety from Reference 6. For details of the analyses and sources, the reference should be examined. Since the reference was approved in 1999, additional information has been analyzed and presented to the NRC as part of the ongoing Methods benchmarking. Reference 8 provides an example of this, addressing the 10x10 tracking. The tracking data for 10x10 fuel has been analyzed and confirms the validity of the total bundle power uncertainty given in the table.

The 3DMONICORE™ methods and methods uncertainties have been reviewed and approved by the Nuclear Regulatory Commission (Ref. 6). "Uncertainty due to LPRM Updates and Instrument Failure" addresses both the LPRM Calibration Interval and

failure of one TIP machine (up to [[ ]]). The maximum RMS difference in bundle power due to missing TIP data with 2000 EFPH calibration interval is [[ ]]as is found in Table 1 and is used as the uncertainty allowance for missing TIP data. It should be noted that this determination of 3DMONICORE™ bundle power uncertainties is not dependent on the evaluation of the SLMCPR, although the approved methodology for cycle-specific SLMCPR utilizes these uncertainties.

From the analyses performed in Reference 6 above, the qualification basis for monitoring MCPR includes the 2000 EFPH calibration interval. The Reference 7 document shows that the qualification for the latest core physics methods remains the same as for the previous evaluations.

Therefore, it is concluded that CPS can be operated within the Power Distribution Uncertainties for Safety Limit MCPR (Ref. 6) with 3DMONICORE™ for 2000 EFPH without running a full TIP set and calibrating LPRMs, with one TIP machine OOS and [[ ]] of the LPRMs failed or rejected indefinitely.

4.2 SLMCPR Impact of Conservatively Doubling the Update Uncertainty

Additionally, although Reference 6 shows that the 2000 EFPH is part of the design basis for the uncertainties found in Table 1, Reference 10 provides the following conservative analysis in support of the LAR.

As stated in the Technical Specifications basis regarding LPRM calibration interval requirement, "The 1000 MWD/T Frequency is based on operating experience with LPRM sensitivity changes." Figure 1 is a typical graph of the natural logarithm of the LPRM calibration current versus the LPRM exposure. [[

]]

[[

]]

[[

]]

Figure 1 LPRM Calibration as a function of LPRM exposure

The last sentence of Section 3.2 of Reference 6 states:
[[

]]

By doubling the LPRM update uncertainty, the total update uncertainty becomes:
[[ ]]

Equation 3-3 of Section 3.3 of Reference 6 then is used to fold the total update uncertainty into the total bundle power uncertainty:
[[ ]]

Therefore, by doubling the LPRM update uncertainty, the total bundle power uncertainty becomes [[

]]

For Clinton Power Station, comparison between SLMCPR calculations using the original LPRM update uncertainty and the doubled LPRM update uncertainty shows an [[ ]] on the calculated SLMCPR value.

4.3 LHGR and MAPLHGR Power Uncertainty

The NRC requested additional information and the GEH responses that were provided are included as appendices in the NRC acceptance of the Licensing Topical Report (Ref. 6). In these appendices, the NRC requested an uncertainty analysis for the 3DMONICORE™ prediction of peak kW/ft and MAPLHGR. In response, an analysis was performed then documented in Appendix A and later updated in Appendix B. The analysis continued to use the [[ ]]uncertainty allowance for missing TIP data. This [[ ]]is included in the [[
]]. In this appendix, the LPRM update uncertainty on LHGR is shown to be [[ ]]. The nodal uncertainty derived was [[ ]]and the total LHGR uncertainty, which included the additional peaking uncertainty [[
]].

The power distribution uncertainty allowance for thermal-mechanical analysis is [[ ]]for LHGR. The [[ ]]uncertainty includes the LPRM update uncertainty derived in the approved licensing report and is well within this allowance. The variability in MAPLHGR would be less than for LHGR because of the exclusion of the local peaking uncertainty. With this in mind, it is confirmed that the uncertainties for LPRM updates of 2000 EFPH intervals or less are acceptable within the qualification basis.

4.4 Calibration Of LPRMs

Reference 6, Section 4, analyzed the effects on operation of TIP and LPRM failures. The analyses performed included the effects on LPRM calibration with a single TIP OOS. Again, the approved NRC topical used the missing TIP data uncertainty in the stack-up for the LPRM update uncertainty.

The calibration with missing TIP information will be performed differently for those LPRMs that do not have TIP-supplied data. Basically, the planar average adaption correction term (which is applied to the [[
]]) will be applied based on the TIP strings that are present. However, this update of the LPRM calibration has been taken into account in the references and the currently approved uncertainties already have the TIP OOS included.

4.5 LPRM Gain Adjustment Factor

The recommended acceptance range for LPRM Gain Adjustment Factors (GAFs) following amplifier calibration is 1.00 +/- 0.15. The LPRM system also provides neutron flux signal inputs to the Average Power Range Monitor (APRM) system, Oscillation Power Range Monitor (OPRM) system, and the Rod Block Monitor (RBM) system, in addition to the 3D MONICORE core monitoring system. The APRM system provides indication of core average thermal power and input to the Reactor Protection System (RPS). The OPRM system is capable of detecting thermal-hydraulic instability by monitoring the local neutron flux within the reactor core. It also provides input to the RPS. The RBM system prevents the withdrawal of selected control rods when local power is above a preset limit. LPRM inputs to the 3D MONICORE system are used to calculate core power distribution and ensure operation within established fuel thermal operating limits.

The APRM readings are maintained within +/- 2% of core thermal power by calibration against weekly heat balance calculations. The core monitoring system corrects the value of LPRM reading used in the thermal limits calculation for burnup induced sensitivities. Because the LPRM chamber responses are very linear over the interval involved, the LPRM interval extension and the GAF range have an insignificant effect on the APRM accuracy during the power maneuvers or transients between LPRM calibrations. When a rod is selected, the RBM channel readings are automatically calibrated against an APRM reading and the rod block trips are set to a percentage, corresponding to the safety analysis, of the calibrated reading. Again, because LPRM chamber responses are very linear over the interval involved, the RBM system response during rod withdrawal is not significantly affected.

5. Review of the AmerGen (Exelon) Evaluation of Proposed Changes

References 1 and 9 are the evaluations provided by AmerGen (Exelon) in support of the proposed change in LPRM calibration interval to 2000 EFPH. A review of these documents was performed by GNF.

Although 2500 MWD/T is not explicitly addressed by References 2 through 7,

AmerGen's argument is reasonable given the conditions that they cite, including the improved core monitoring system and the better methods comparison (e.g. PANAC11 methods having a [[ ]]) which is found in Reference 7.

Reference 1 evaluated application of the change in interval within the GETAB uncertainties. However, this is also applicable for the CPS in that the plant uses the approved improved SLMCPR methodology documented in Reference 6, commonly referred to as Reduced Uncertainties. The evaluation that Exelon performed is consistent with the methodology of GNF and the applicability of the bounding interval in Reference 6 and the conditions detailed in Reference 10.

6. Conclusion

The impact of an increase in the LPRM calibration to 2000 EFPH has been included in the qualification of the core monitoring system 3DMONICORE™ for CPS. The safety and licensing analyses are consistent with the power uncertainty of the core monitoring system, and these have been reviewed and approved by the USNRC. Therefore, operation with the LPRM calibration interval up to 2000 EFPH at CPS, is justified using the existing safety evaluations as stated by the USNRC in the SER of Reference 6.

7. References

1. Letter from K. R. Jury (AmerGen Energy Company, LLC – An Exelon Company) to U.S. Nuclear Regulatory Commission, "Request for a License Amendment to Revise Local Power Range Monitor Calibration Frequency," dated December 12, 2006.
2. NEDE-20340-3, "Process Computer Performance Evaluation Accuracy", November 1985.
3. NEDE-20340-3, Rev 1, "Process Computer Performance Evaluation Accuracy", April 1986.
4. NEDE-20340-3, Rev 2, "Process Computer Performance Evaluation Accuracy", August 1991.
5. NEDE-34321, "3DMONICORE (RL3D) Performance Evaluation Accuracy", January 1994.
6. NEDC-32694P-A, "Power Distribution Uncertainties for Safety Limit MCPR Evaluations", August 1999.
7. NEDC-32773P Rev. 1 "Advanced Methods Power Distribution Uncertainties for Core Monitoring" January 1999.
8. Letter, G. A. Watford (GNF) to R. Pulsifer (NRC), "Request for Additional Information – GE14 Review – Power Distribution Uncertainties and GEXL Correlation Development Procedure," March 27, 2001 (FLN-2001-004).
9. Letter from D. M. Benyak (AmerGen Energy Company, LLC – An Exelon Company) to U.S. Nuclear Regulatory Commission, "Additional Information Supporting the Request for a License Amendment to Revise Local Power Range Monitor Calibration Frequency," dated November 16, 2007.
10. GNF S-0000-0083-7705, "Clinton Power Station LPRM Calibration Interval Extension Support", George M. Baka, April 22, 2008.